

**U.S. Department of the Interior
Bureau of Land Management**

**Environmental Assessment for the Beaver Creek
Unit Nos. 9-43 and 15-31 Oil Wells**



PREPARING OFFICE

U.S. Department of the Interior
Bureau of Land Management
Lander FO
1335 Main Street
Lander, WY 82520 USA



Environmental Assessment for the Beaver Creek Unit Nos. 9-43 and 15-31 Oil Wells

**Prepared by
U.S. Department of the Interior
Bureau of Land Management**

This page intentionally
left blank

Table of Contents

1. Purpose and Need for Action:	1
1.1. Introduction:	1
1.2. Project Area Description:	1
1.3. Purpose of the Proposed Action:	1
1.4. Need for the Proposed Action:	2
1.5. Conformance to BLM Land Use Plan(s):	2
1.6. Relationship to Other Statutes, Regulations or Plans:	2
1.7. Identification of Issues and Resources:	2
1.7.1. Identified Relevant Issues and Resources:	3
1.7.1.1. Climate, Climate Change and Air Quality:	3
1.7.1.2. Soils:	3
1.7.1.3. Vegetation Including BLM Wyoming Special Status and Noxious/Invasive Plants:	3
1.7.1.4. Wildlife Including BLM Wyoming Special Status Species:	4
1.7.2. Resources Considered But Eliminated From Further Analysis:	4
1.7.2.1. Floodplains:	4
1.7.2.2. Prime or Unique Farmland:	4
1.7.2.3. Wild and Scenic Rivers:	4
1.7.2.4. Coastal Zone Areas:	4
1.7.2.5. Minority and Low-Income Populations:	4
1.7.2.6. State, or Natural Parks, Forests, Conservation Areas, or Other Areas of Recreational, Ecological, Scenic or Aesthetic Importance:	4
1.7.2.7. Vegetation Resource Threatened and Endangered Species:	4
1.7.2.8. Rangeland Resources:	5
1.7.2.9. Socioeconomics:	5
1.7.2.10. Visual Resources:	5
1.7.2.11. Geology:	5
1.7.2.12. Wetlands:	5
1.7.2.13. Water Quality:	5
1.7.2.14. Cultural and Paleontological Resources:	6
1.8. Remarks:	6
2. Description of Alternatives, Including Proposed Action:	9
2.1. Introduction:	11
2.2. Description of Alternatives, Including the Proposed Action and No Action:	11
2.2.1. Alternative A- No Action:	11
2.2.2. Alternative B- Proposed Action:	11
2.2.2.1. Design Features of the Proposed Action:	14
2.3. Alternatives Considered, But Eliminated From Further Analysis:	18
2.4. Summary of Impacts:	19
3. Affected Environment and Environmental Impacts:	21
3.1. Introduction:	23

3.1.1. General Setting:	23
3.1.2. Resources/Issues Brought Forward for Analysis:	23
3.1.3. General Impact Analysis Assumptions and Guidelines:	23
3.1.4. Cumulative Impacts:	24
3.2. Climate, Climate Change and Air Quality:	24
3.2.1. Description of Climate, Climate Change and Air Quality Resources:	24
3.2.2. Impacts to Climate, Climate Change, and Air Quality under Alternative A- No Action:	26
3.2.2.1. Direct and Indirect Impacts:	26
3.2.2.2. Cumulative Impacts:	26
3.2.3. Impacts to Climate, Climate Change, and Air Quality under Alternative B- Proposed Action:	27
3.2.3.1. Direct and Indirect Impacts:	27
3.2.3.2. Cumulative Impacts:	28
3.3. Soils:	28
3.3.1. Description of Soil Resources:	28
3.3.1.1. Absher-Elkol Complex:	28
3.3.1.2. Badland-Seaverson-Blazon Complex:	28
3.3.2. Impacts to Soils under Alternative A- No Action:	29
3.3.2.1. Direct and Indirect Impacts:	29
3.3.2.2. Cumulative Impacts:	29
3.3.3. Impacts to Soils under Alternative B- Proposed Action:	29
3.3.3.1. Direct and Indirect Impacts:	29
3.3.3.2. Cumulative Impacts:	30
3.4. Vegetation, Including Noxious/Invasive Plants:	30
3.4.1. Description of Ecological Sites and Potential Vegetation:	30
3.4.1.1. Absher-Elkol Complex Ecological Site Description:	30
3.4.1.2. Badland-Seaverson-Blazon Complex Ecological Site Descriptions:	31
3.4.2. Impacts to Vegetation under Alternative A- No Action:	31
3.4.2.1. Direct and Indirect Impacts:	31
3.4.2.2. Cumulative Impacts:	31
3.4.3. Impacts to Vegetation under Alternative B- Proposed Action:	31
3.4.3.1. Direct and Indirect Impacts:	31
3.4.3.2. Cumulative Impacts:	33
3.5. Wildlife, Including BLM Wyoming Special Status Species:	33
3.5.1. Description of Wildlife Resources:	33
3.5.1.1. General Wildlife:	33
3.5.1.2. BLM Wyoming Special Status Species:	33
3.5.2. Impacts to Wildlife Species under Alternative A- No Action:	34
3.5.2.1. Direct and Indirect Impacts:	34
3.5.2.2. Cumulative Impacts:	34
3.5.3. Impacts to Wildlife Species under Alternative B- Proposed Action:	35
3.5.3.1. Direct and Indirect Impacts:	35
3.5.3.2. Cumulative Impacts:	37
3.6. Unavoidable Adverse Impacts (All Resources):	38
3.6.1. Unavoidable Adverse Impacts Under Alternative A- No Action:	38
3.6.2. Unavoidable Adverse Impacts Under Alternative B- Proposed Action:	39
3.7. Relationship of Short-Term Uses and Long-Term Productivity (All Resources):	39

3.7.1. Relationship of Short-Term Uses and Long-Term Productivity Under Alternative A- No Action:	39
3.7.2. Relationship of Short-Term Uses and Long-Term Productivity Under Alternative B- Proposed Action:	39
3.8. Irreversible and Irretrievable Commitments of Impacted Resources:	39
3.8.1. Irreversible and Irretrievable Commitments of Resources Under Alternative A- No Action:	40
3.8.2. Irreversible and Irretrievable Commitments of Resources Under Alternative B- Proposed Action:	40
4. Consultation and Coordination:	41
4.1. Persons, Groups, and Agencies Consulted:	43
4.2. Summary of Public Participation:	43
Appendix A. Map of Project Area	45

This page intentionally
left blank

List of Figures

Figure 3.1. Mean Monthly Temperature Ranges and Total Precipitation Amounts	25
---	----

This page intentionally
left blank

List of Tables

Table 1.1. Potentially Significant Resources	3
Table 2.1. Access Road Water Bar Spacing	12
Table 2.2. Summary of Impacts to Affected Resources from Each Alternative	19
Table 3.1. Irreversible and Irretrievable Commitments of Resources Under Alternative A- No Action	40
Table 3.2. Irreversible and Irretrievable Commitments of Resources Under Alternative B- Proposed Action	40
Table 4.1. List of Preparers	43

This page intentionally
left blank

Chapter 1. Purpose and Need for Action:

This page intentionally
left blank

1.1. Introduction:

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of the Devon Energy Production Company, L.P. Beaver Creek Unit Nos. 9-43 and 15-31 Oil Wells Project as proposed by Devon Energy Production Company, L.P. (Devon). The EA is a site specific analysis of potential impacts that could result with the implementation of a Proposed Action or alternatives to the Proposed Action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impacts” (FONSI). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the selected alternative, whether the Proposed Action or another alternative. A DR, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in “significant” environmental impacts.

1.2. Project Area Description:

Devon Energy Production Company, L.P. (Devon) filed two Applications for Permits to Drill (APD) with the Bureau of Land Management, Lander Field Office. The APD for the Beaver Creek Unit Nos. 9-43 and 15-31 Oil Wells was received on March 6, 2014. The specific proposal is to drill and install associated facilities for these wells located in the Beaver Creek Unit in Sections 9 and 15, Township 33 North, Range 96 West, on BLM Federal oil and gas leases WYC-048239 and WYC-048241.

The proposed project area is in the Beaver Creek Unit, approximately 14 miles southeast of Riverton, Wyoming, in Sections 9 and 15, Township 33 North, Range 96 West, 6th P.M., Fremont County, Wyoming. The wells are administered by the Bureau of Land Management Lander Field Office, located in Lander, Wyoming.

1.3. Purpose of the Proposed Action:

The purpose of this Proposed Action is for BLM to process the requests (APD) for Devon (as operator) to explore and develop the oil and gas reserves within Federal mineral leases WYC-048239 and WYC-048241, to fulfill the valid and existing oil and gas lease, and to provide for the sale of developed minerals. Specifically, 43 CFR 3101.1-2 states, “The lessee shall have the right to use so much of the leased land that is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold...” Consistent with these rights, the lessee has filed two APD to drill and install associated facilities for two oil wells. Any hydrocarbon products derived from this action would help meet the public’s demand. The decision to be made is whether to approve or reject Devon’s APD for the Beaver Creek Unit Nos. 9-43 and 15-31 Oil Wells Project. Design Features and procedures are included in the APD, EA, and Conditions of Approval (COA).

1.4. Need for the Proposed Action:

The need for action is reflected in BLM's role in permitting of exploration and development of a federal oil and gas lease by private industry, including transport and delivery of produced oil and gas. The requirement to act in consideration of APD is an integral part of the BLM's oil and gas program under authority of the Mineral Leasing Act of 1920 as amended, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976, the National Materials and Minerals Policy, Research and Development Act of 1980, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. BLM is directed by guidance, statute, and regulation to describe the environment of area(s) to be affected or created by alternatives under consideration.

1.5. Conformance to BLM Land Use Plan(s):

The Proposed Action is subject to the Lander Resource Management Plan (RMP), approved on June 9, 1987. The Lander Field Office, as required by 43 CFR 1610.5, has determined that the Proposed Action conforms to the decisions, guidelines, terms and conditions as described in the Final Environmental Impact Statement and Record of Decision of the Lander RMP.

In addition, the Selected Alternative is consistent with the LFO Proposed RMP Final EIS (BLM, 2013), and the pending BLM LFO RMP Revision, which has not currently been authorized or accepted, but is anticipated to be signed in spring of 2014.

1.6. Relationship to Other Statutes, Regulations or Plans:

This Environmental Assessment is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended. The authority for the APD is the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The APD have been submitted in conformance to Department of the Interior and Bureau of Land Management (BLM) regulations.

1.7. Identification of Issues and Resources:

BLM is directed by guidance, statute and regulation to describe the environment of area(s) to be affected or created by alternatives under consideration. CEQ regulations direct BLM to concentrate efforts on important issues, especially the presence or absence of the potentially significant resources presented in Table 1. All areas presented in Table 1 were considered, but many were determined to not be pertinent to the Proposed Action or affected to a degree of any importance, and therefore, were not carried forward for further analysis. If particular resources are not affected beyond minimal amount, or if the resource is not present, there will be no further discussion of the resources in the Affected Environment (Chapter 3), or in any of the subsequent impact analysis. The discussion of these environmental impacts is therefore restricted to topics related to resources which are affected and carried forward for analysis.

Table 1.1. Potentially Significant Resources

RESOURCE	GUIDANCE OR AUTHORITY
Floodplains	EO 11998; 10 CFR 1022
Wetlands	EO 11990; 10 CFR 1022, CEQ 1508.27(b)(3)
Threatened, endangered, or candidate species and/or their critical habitat, and other special status (e.g., state-listed) species	CEQ 1508.27(b)(9)
Prime or unique farmland	7 USC 4201; CEQ 1508.27(b)(3)
State or national parks, forests, conservation areas, or other areas of recreational, ecological, scenic, or aesthetic importance	CEQ 1508.27(b)(3)
Wild and Scenic Rivers	16 USC 1271; CEQ 1508.27(b)(3)
Natural resources (e.g., vegetation, rangeland, soils, minerals, fish, wildlife, water bodies)	CEQ 1508.8
Coastal Zone areas	16 USC 1451 et seq.
Property of historic, archeological, or architectural significance (including sites on or eligible for the National Register of Historic Places and the National Registry of Natural Landmarks)	EO 11593; CEQ 1508.27(b)(3)(8)
Native American Concerns	EO 13007
Minority and low-income populations (including a description of their use and consumption of environmental resources)	EO 12898
Migratory Birds	EO 13186

1.7.1. Identified Relevant Issues and Resources:

1.7.1.1. Climate, Climate Change and Air Quality:

Potential impacts to climate and climate change have been identified in Instruction Memorandum No. 2008-171 to include analysis of climate change in Environmental Assessments. Potential temporary (30 to 45 days) impacts to air quality during the project drilling and construction related activities, and long-term (20+ years) impacts for the duration of the wells' operating lives were identified.

1.7.1.2. Soils:

Potential loss of soil stability and fertility and increase in soil compaction could exist from soil disturbance activities and heavy truck and equipment activities in the project area.

1.7.1.3. Vegetation Including BLM Wyoming Special Status and Noxious/Invasive Plants:

Potential loss of vegetative cover and ecological diversity, and increase in noxious/invasive plants in the project area could be caused by direct impacts from construction activities and indirect establishment of noxious/invasive plants from seed sources by vehicles traveling to and from the project site.

1.7.1.4. Wildlife Including BLM Wyoming Special Status Species:

The BLM Wildlife Biologist determined that no suitable habitat for Threatened and Endangered Species exists in the project area.

The project area is not located within BLM Wyoming Greater Sage-Grouse Core Area. However, suitable habitat for BLM Wyoming Special Status Species, greater sage-grouse exists in the project area. Other BLM Wyoming Special Status Species that may be present in the project area include mule deer, pronghorn antelope, raptors, migratory birds and sagebrush obligate bird species (i.e. sage thrasher, loggerhead shrike, sage sparrow and Brewer's sparrow). Habitat for these species shall be avoided and disturbance minimized, where possible. The Design Features described in Chapter 2.2.2.1 will provide mitigation measures to prevent significant adverse impacts to these species.

1.7.2. Resources Considered But Eliminated From Further Analysis:

1.7.2.1. Floodplains:

No floodplains were observed or identified in the project area.

1.7.2.2. Prime or Unique Farmland:

No prime or unique farmlands were observed or identified in the project area.

1.7.2.3. Wild and Scenic Rivers:

No Wild and Scenic Rivers were observed or identified in the project area.

1.7.2.4. Coastal Zone Areas:

No Coastal Zone Areas were observed or identified in the project area.

1.7.2.5. Minority and Low-Income Populations:

No determination was made regarding the minority and low-income populations of this action. The project is located in an unpopulated area.

1.7.2.6. State, or Natural Parks, Forests, Conservation Areas, or Other Areas of Recreational, Ecological, Scenic or Aesthetic Importance:

No areas relating to these criteria were observed or identified in the project area.

1.7.2.7. Vegetation Resource Threatened and Endangered Species:

A BLM Wildlife Biologist conducted a vegetation clearance of the project area and determined that no Threatened, Endangered, or listed species or habitats are present in the project area.

*Chapter 1 Purpose and Need for Action:
Resources Considered But Eliminated From Further
Analysis:*

1.7.2.8. Rangeland Resources:

The Proposed Action was reviewed by a BLM Range Specialist and it was determined that no impacts would occur to rangeland improvement facilities, monitoring sites or grazing activities by this action. The small loss of acreage from the project will not impact livestock production.

1.7.2.9. Socioeconomics:

No determination was made regarding the socioeconomics of this action.

1.7.2.10. Visual Resources:

The project area occurs in a Visual Resource Management Class IV designation. The objective of Class IV designation is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

1.7.2.11. Geology:

No special geological areas or concerns were observed or identified in the project area.

1.7.2.12. Wetlands:

No wetlands were observed or identified in the project area.

1.7.2.13. Water Quality:

Groundwater: The regional static depth to groundwater is approximately 90 feet in this area (Wyoming State Engineer's Office, 2014). Given the depth to groundwater, the potential from groundwater contamination from this action is not anticipated due to spills or potential seepage from the reserve pits.

Drilling may penetrate several water bearing zones, and fresh water will be expected in the surface sediments. To lessen any potential impacts, the BLM Petroleum Engineer and Geologist will review the proposed Drilling Program submitted by the operator to ensure that casing and cementing designs meet or exceed standard safety factors. Any sub-surface water will be protected with special casing and cementing designs. The 350 feet of surface casing, or surface casing set through the fresh water bearing zones in the upper Wind River formation (if deeper than 350 feet), proposed in the drilling programs for these two wells will provide sufficient protection for groundwater resources. Operations will be monitored and inspected during the drilling process and throughout the duration of the wells' operating lives. Any additional activities such as re-completions or pluggings are similarly designed and reviewed to protect groundwater resources. The Design Features described in Chapter 2.2.2.2 will provide sufficient mitigation and protection measures to prevent adverse impacts to groundwater resources.

Surface Water: The closest source of surface water is Beaver Creek, approximately 0.5 miles east of the BCU 9-43 and 0.5 miles west of the BCU 15-31 location. Mitigation in the form of erosion control structures will be installed to prevent the movement of sediment off the project area, drainages, or roadways. As the nearest surface water is approximately 0.5 miles from the project areas, no erosion, sedimentation or contaminants are expected to reach this surface

*Chapter 1 Purpose and Need for Action:
Resources Considered But Eliminated From
Further Analysis:*

water due to the distance, topography and soil characteristics. The Design Features described in Chapter 2.2.2.1 will help prevent erosion, sedimentation or contaminants from significantly impacting surface water.

1.7.2.14. Cultural and Paleontological Resources:

In August of 2013, **Western Archeological Services** conducted a Class III inventory of the proposed **BCU MAD #9-43 Well and Access Project, Fremont County, Wyoming** (Report No. **050-2014-020**).

Legal Description: **T33N, R96W, Section 9**

Quad(s): **Bringhoff Ranch 7.5'**

Cultural resources found? No // Yes ☒ /, #'s: **48FR517 (prehistoric camp)**

N.R. Eligible resources found? No ☒ / Yes / /, #'s: _____

N.R. Eligible resources affected? No ☒ / Yes / /, #'s: _____

SHPO concurrence with above granted? Not necessary ☒ / No / / Yes / / SHPO Ref.
#: _____

In July of 2013, **Western Archeological Services** conducted a Class III inventory of the proposed **BCU MAD #15-31 Well and Access Project, Fremont County, Wyoming** (Report No. **050-2014-021**).

Legal Description: **T33N, R96W, Section 15**

Quad(s): **Bringhoff Ranch 7.5'**

Cultural resources found? No // Yes ☒ /, #'s: **48FR819 (prehistoric camp), IR15 (prehistoric lithic scatter)**

N.R. Eligible resources found? No ☒ / Yes / /, #'s: _____

N.R. Eligible resources affected? No ☒ / Yes / /, #'s: _____

SHPO concurrence with above granted? Not necessary ☒ / No / / Yes / / SHPO Ref.
#: _____

There is a potential for cultural resources to be present in portions of the project area. The Design Features and Stipulations described in Chapter 2.2.2.1 will provide sufficient mitigation and protection measures to prevent adverse impacts to cultural resources.

1.8. Remarks:

On February 13, 2014, an onsite field examination was held for the Beaver Creek Unit Nos. 9-43 and 15-31 Oil Wells Project. The examination was attended by Andrew Gibbs and Laura Lozier (BLM), David McDonald (Devon), and Aaron Grosch (P.E. Grosch Construction, Inc.). Surface Use and Drilling Conditions of Approval (COA) are attached to the APD as part of this approval along with the General COA as directed by Wyoming State IM No. 94-052 dated February 7,

Chapter 1 Purpose and Need for Action:
Remarks:

1994. Their combined contents will mitigate the potential impacts associated with the activities of the Proposed Action. As directed by WO IM No. 2004-194, should the APD be approved, all applicable Best Management Practices (BMP) will be incorporated into the Proposed Action, and will be included in the BLM applied COA.

This page intentionally
left blank

Chapter 2. Description of Alternatives, Including Proposed Action:

This page intentionally
left blank

2.1. Introduction:

Chapter 2 describes in detail the Proposed Action and alternatives, and compares the alternatives in terms of the environmental impacts as identified in Section 1.7, Identification of Issues. The Proposed Action is to install/drill two oil wells on BLM surface to explore, and if successful, develop oil and gas resources in a Federal Oil and Gas Lease. BLM, under the MLA, must allow for the exploration and development of these resources, but would authorize use of the Federal surface and mineral resources to minimize, reduce, and avoid impacts.

Design Features, as presented in Section 2.2.2.1, have been incorporated into the Proposed Action by Devon and were agreed upon with BLM. In addition, the Design Features may include standard operating procedures, Conditions of Approval, Stipulations, and all applicable Federal, State and local laws, regulations, Onshore Oil and Gas Orders, Instruction Memorandums, and Management Decisions of the Lander RMP.

2.2. Description of Alternatives, Including the Proposed Action and No Action:

2.2.1. Alternative A- No Action:

The No Action alternative provides a baseline for comparison of the alternatives. This alternative describes the existing conditions and the continuing trends. If this alternative were to be selected, it would involve denial of the operator's APD. The lessee would not be able to fulfill their valid lease to produce hydrocarbon products to meet the public's demand. The Beaver Creek Unit Nos. 9-43 and 15-31 oil wells would not be installed under the submitted APD. Also under this alternative, the well pads, access roads, pipelines and utility lines would not be constructed. In addition, 8.7 acres of new surface on BLM surface associated with construction activities would not occur under the No Action alternative. No additional production facilities would be necessary. The proposed project area would not be disturbed, requiring no reclamation of the site associated with the project.

The No Action alternative would result in existing conditions and continuing trends of oil and gas production in the Beaver Creek Unit. The best available data (Wyoming Oil and Gas Conservation Commission, 2014) indicate that there are currently 329 wells in the Beaver Creek Unit, 266 of which are active. The Beaver Creek Unit also contains the Beaver Creek Gas Plant and an extensive network of roads, pipelines and power lines.

2.2.2. Alternative B- Proposed Action:

Description of Proposed Action:

The Operator proposes to drill two oil wells in the Beaver Creek Unit (Map, Exhibit "A"). The Proposed Action includes well pads, access roads, pipelines and utility lines for the wells (Exhibit "A") Total new short-term (three to five years) disturbance from installation of the wells would be approximately 8.7 acres. Upon completion of drilling and interim reclamation, it is estimated that 5.8 acres of surface disturbance would remain for the duration of the wells' operating lives (20+ years).

The proposed wells will be vertically drilled with a primary objective of the Madison formation. The BCU No. 9-43 well will have an approximate Total Vertical Depth (TVD) of 12,360 feet and a Total Measured Depth (TMD) of 12,416 feet. The BCU No. 15-31 well will have an approximate TVD of 12,500 feet and a TMD of 12,518 feet. As a result of this action, there will be surface use actions as described below. Authorizations of these APD are subject to the attached Surface Use, Drilling, and General Conditions of Approval (Exhibit "B").

Access: The project includes use of existing access roads and construction of new access roads on federal surface. The total length of new access roads on BLM surface will be 610 feet, with a width of 30 feet (0.4 acres).

The existing access roads will be required to support the proposed maintenance activities for the duration of the wells' operating lives (20+ years). Culverts and water bars will be installed where necessary along the route. After roadway construction is complete, the access roads will be required to support the proposed maintenance activities for the duration of the wells' operating lives (20+ years). If the wells enter into commercial production, the access roads will be surfaced as necessary with gravel or crushed rock from an approved off-site location to blend with the surrounding landscape. The roads will be maintained in good repair throughout all operations associated with the wells. The existing access roads will be maintained as crowned and ditched roads in accordance with the minimum standards of a local or resource road as established in the BLM Road Standards Manual, Section 9113; and in The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Fourth Edition, 2007. No flat blading of access roads is permitted.

All roads will be required to be maintained so as not to impede natural drainage and to prevent erosion. Erosion and sediment control structures will be installed below all fill slopes. The project will be monitored on a regular basis, and any erosion problems will be corrected immediately. Water bars will be installed along roadways where grades exceed a slope of 2%. All water bars will be constructed with the berm on the downhill side to prevent the trench from silting up. Water bar spacing will be as follows:

Table 2.1. Access Road Water Bar Spacing

Slope (percent)	Spacing Interval (feet)
2 or <	200
2-4	100
4-5	75
5 or >	50

Construction activities will not begin until immediately prior to drilling, and interim reclamation activities will be completed within six months of construction completion. All suitable topsoil will be conserved for use in future reclamation.

To prevent excessive loss of soil as a result of wind erosion on the project location and along the access roads, water applications or other non-saline suppressants with at least 50 percent control efficiency will be required. Dust inhibitors will be used as necessary and any erosion problems will be corrected immediately.

Well Site Layout: Two rectangular well pads will be constructed at the proposed well locations. Approximately four to six inches of topsoil will be removed from all undisturbed areas prior to beginning construction, and will be stockpiled for use in future reclamation of the well sites. The topsoil and spoil piles will be mounded separately to prevent mixing. Reserve pits

measuring 170 feet x 45 feet x 14 feet deep will be constructed within the cut areas of each well pad. Total disturbance associated with the well pad, adjacent topsoil and spoil piles, and construction affected areas will be approximately 3.7 acres for each well. Upon completion of drilling and interim reclamation, the well sites will be reclaimed, leaving an estimated 2.7 acres of un-reclaimed long-term (20+ years) disturbance for each well.

All drilling fluids will be contained in the reserve pits. Upon well completions, drilling fluids will be recycled, returned to the contractor and removed from the site. All cuttings will be solidified and buried in the lined reserve pits. The reserve pits will be lined with impermeable, synthetic material to prevent seepage into underlying soil and water. No hydrocarbons will be allowed in the reserve pits. Any hydrocarbons inadvertently entering the reserve pits will be removed immediately. All structures designed to hold fluids will have impervious dikes constructed around them designed to contain any spills or leaks. Any spill or leak will be immediately reported and cleaned up.

In addition, a composite sample of the oil based mud cuttings will be analyzed using the Toxic characteristic Leachate Procedure (TCLP) (See 40 CFR 261 Appendix II) for the presence of heavy metals. The sample will also be tested for chlorides and Total Petroleum Hydrocarbons (TPH). If the analysis shows any toxicity levels above regulatory levels established by the Environmental Protection Agency (EPA) or the State Department of Environmental Quality (DEQ), a plan for disposal and/or treatment of the cuttings shall be submitted to the Administrative Officer for approval.

Surface Facilities: No production facilities will be located on the well pads. All temporary tank batteries and facilities designed to contain fluids shall be surrounded by an impervious dike designed to contain 110% of the contents of the largest vessel should a leak or spill occur. All pipeline and other load lines will terminate within the bermed area. All long-term above ground production facilities shall be painted the color *Covert Green*.

Pipelines: A total length of 1,702 feet of three-inch flowline with a construction width of 10 feet will be installed for the two wells. All pipelines will be installed adjacent to access roads. Total short-term (three to five years) disturbance from installation of these pipelines will result in approximately 0.4 acres of additional disturbance beyond the access road corridor. All pipelines will be buried to a sufficient depth to allow for a minimum of 60 inches of backfill overtop. The total surface disturbance from the pipelines will be reclaimed after installation, and no additional surface disturbance will be expected.

Utility Lines: A total length of 2,009 feet of utility lines with a construction width of 10 feet will be installed for the two wells. Total short-term (three to five years) disturbance from installation of these utility lines will result in approximately 0.5 acres of additional disturbance beyond the access road corridors. All utility lines will be installed adjacent to access roads.

Water Supply: The operator will obtain water for drilling operations from Beaver Creek water well No. 108, located in NWNE Section 16, Township 33 North, Range 96 West. The water will be transported by an approved commercial water hauler within the Beaver Creek Unit. Produced water will be used for drilling the production casing, but will not be used for surface drilling. No new water well will be drilled on location.

Drilling Activities: Drilling of a typical well requires transport of approximately 35 truckloads of drilling-related equipment and materials to facilitate the operation, depending upon the development area. This includes transportation of the drill rig, drill pipe, drilling fluid products,

and related support equipment, but does not include the truck traffic required for resupplying the operation (e.g. fuel, drilling fluid additives, etc.). The extent of additional traffic would depend on the phase of the drilling operations, but would not include more than six or seven vehicles per day per drill site throughout the drilling operations.

Drilling Fluids and Hydrocarbons Produced During Completions: Devon is proposing to drill the wells using an oil based mud system. Drill cuttings will be placed in the reserve pits. Excess free fluid will be removed from the drill cuttings pits via the standard evaporation process. Disposal of drilling fluids by methods other than by evaporation will be submitted for approval to the BLM as a separate action. If groundwater is encountered during surface drilling, this water will be required to enter the pits. Fluids and hydrocarbons produced during completion will be placed in tanks and no completion fluids and hydrocarbons will be allowed into the reserve pits.

2.2.2.1. Design Features of the Proposed Action:

Design Features are those specific means, measures or practices that make up the Proposed Action and alternatives. Standard operating procedures, stipulations and best management practices are considered to be Design Features.

The activities, procedures, and Design Features to which Devon has committed in agency submittals, or agreed upon based on the onsite inspection with BLM, are compiled below. These Design Features are included as part of the proposed project as COA in an effort to prevent adverse environmental impacts from occurring during project implementation, and minimize the type and magnitude of impacts to resources in the project area.

Air Quality: The operator will contact the Wyoming Department of Environmental Quality (WDEQ), Air Quality Division to determine the permit requirements prior to the installation of any oil and gas well production equipment. The Air Quality Division will provide the owner/operator with forms and guidelines for permitting and controlling air contaminant emissions from this equipment. The production of dust will be significantly reduced through accepted dust abatement techniques. Techniques include, but are not limited to, the seeding of all disturbed areas that are not utilized during the well production phase (e.g. borrow ditches and topsoil and spoil piles), and the application of water to roadways during dry periods.

Cultural, Paleontological, and Historic Resources: There is a potential for buried cultural resources to be present in the project area. The Design Features and Stipulations described below will provide sufficient mitigation and protection measures to prevent adverse impacts to cultural and paleontological resources.

BCU Nos. 9-43 and 15-31: CULTURAL AND PALEONTOLOGICAL RESOURCES

STIPULATION: Any cultural and/or paleontological resource (historic or prehistoric site or object or fossil) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures shall be made by the Authorized Officer after consulting with the holder.

*Chapter 2 Description of Alternatives, Including
Proposed Action:
Alternative B- Proposed Action:*

BCU No. 9-43: CULTURAL RESOURCES, SITE MONITORING: The holder of this authorization shall provide an archeologist, with a current BLM Cultural Resources Use Permit, to monitor ground disturbing activities at the following locations:

T.33N., R.96W. Section 9 All (well pad and access road)

The archeologist shall notify the Authorized Officer prior to beginning site monitoring. Construction methods shall be utilized which will allow the identification of cultural resources without endangering the personnel monitoring the construction activities. The archeologist shall specify the depths of cuts made by earth-moving equipment, and the holder must comply with the archeologist's requirements. Monitoring shall continue until work is completed or until strata that could possibly contain cultural resources will no longer be disturbed. Soil stratigraphy shall be recorded whether or not cultural resources are discovered.

If potentially significant cultural resources are identified, and the archeologist determines that further operations will affect the resource, the holder shall suspend all activities in the vicinity of such a discovery until notified to proceed by the Authorized Officer. The Authorized Officer will evaluate, or will have evaluated, such discoveries not later than five working days after being notified, and will determine what action shall be taken with respect to such discoveries. The decision as to the appropriate measures to mitigate adverse effects to significant cultural resources shall be made by the authorized officer after consulting with the holder. The holder shall be responsible for the cost of any investigations necessary for the evaluation, and for any mitigative measures.

A report of all archeological activities, including descriptions of soil stratigraphy, shall be submitted to the authorized officer within 30 days of completion of the field work.

Wildlife: A BLM Wildlife Biologist has determined that no proposed, threatened, and endangered species are present, and no suitable or critical habitat has been identified nor will be affected in the project area (Wildlife Clearance, Exhibit "D"). However, the BLM Wildlife Biologist determined that suitable habitat for certain BLM Wyoming Special Status Species exists in the project area. The following Special Status Species were identified: greater sage-grouse, mule deer, pronghorn antelope, raptors, migratory birds and sagebrush obligate bird species (i.e. sage thrasher, loggerhead shrike, Brewer's sparrow and sage sparrow).

Protective measures for migratory birds are provided pursuant to the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, and Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. 668. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act (FWCA), as amended, 16 U.S.C. 661 et seq., and the Fish and Wildlife Act of 1956, as amended, 16 U.S.C. 742a-742j.

Under the MBTA and BGEPA, the BLM has a mandatory obligation to protect the many species of migratory birds, including eagles and other raptors which may occur on lands under its jurisdiction. Measures included in the project Design Features that will reduce or eliminate adverse impacts to migratory birds include protective buffers, seasonal restrictions, and maintenance of habitat within the project area. Potential adverse impacts to migratory birds from the Proposed Action have been identified and every attempt to mitigate such impacts has been implemented. Protective measures for migratory birds and general wildlife implemented in the Design Features detailed in Chapter 2 pursuant to the MBTA, BGEPA and FWCA will provide mitigation protection in the project area for greater sage-grouse, migratory birds and sagebrush obligate bird species.

The greater sage-grouse, a candidate species, was determined to occur in the area, and is a BLM Special Status Species. USFWS identified it as warranted for listing under the Endangered Species Act, but it is precluded from listing due to other higher priority species. The project area does not lie within BLM Wyoming Greater Sage-Grouse Core Area.

The BLM Wildlife Biologist determined that the project area lies completely within BLM Wyoming designated Crucial Winter Range for mule deer and pronghorn antelope. No surface disturbance, disruptions or construction related activities shall occur in the project area from **November 15 to April 30**. Any exception to this requirement must have prior written approval from

The BLM Wildlife Biologist determined that the **BCU No. 15-31** project area lies within BLM Wyoming designated habitat for raptors. No surface disturbance, disruptions or construction related activities shall occur within **0.75 miles** of raptor nests in the **BCU No. 15-31** project area from **February 1 to July 31, or until young have fledged**. Any exception to this requirement must have prior written approval from

The BLM Wildlife Biologist determined that the project area lies within suitable nesting habitat for a variety of migratory birds, including some BLM Wyoming Special Status species. Surface disturbing and/or disruptive activities that have the potential to cause destruction of reproductive nests, eggs or young of migratory birds **will be prohibited during the period of May 1 to July 15**. A survey of the proposed disturbance area(s) may be conducted by the proponent to determine the presence/absence of nesting migratory birds in consideration of the area's habitat suitability for migratory birds. If the survey locates an active nest or finds signs to indicate that an active nest is likely to be present, then surface disturbing and/or disruptive activities would be delayed until chicks have fledged. If an exception to the timing stipulation is desired, **nest surveys must be conducted no more than 7 days prior to surface disturbing and/or disruptive activities**, and be conducted by a wildlife biologist using standardized methods. If surface disturbing and/or disruptive activities cannot be initiated within 7 days after survey, an additional survey may be necessary before activities can commence during the stipulated nesting period. Nest surveys should include a 5-meter buffer around any area of surface disturbance. For activities with more than a single connected site, clearance surveys would be required for each individual disturbance area. Survey data forms and results will be provided to BLM Lander Field Office before disturbance activities are authorized. Disturbances necessary to deal with emergency situations, public safety concerns or risks, or uncontrollable natural events are exempted from the stipulation. Any exception to this requirement must have prior written approval from the Authorized Officer.

Offsite activities in the project area by operational personnel that are unrelated to the proposed project will be prohibited. All project employees will be notified of all applicable wildlife laws and penalties associated with unlawful take and harassment.

Water and Waste Disposal: These wells will be drilled using a freshwater mud program down to 350 feet. Drilling below 350 feet will be conducted using an oil based mud system. Water flows may be encountered while drilling out the surface holes (between 90 feet to 140 feet) in the proposed area. This water will be diverted into the reserve pits.

All drill cuttings will be contained in the lined reserve pits. Upon well completions, any remaining fluids will be allowed to evaporate, and the cuttings will be buried within the reserve pits. Any produced water and hydrocarbons will be separated and hydrocarbons entering the pits will be removed to an approved central processing facility. The operator must dispose of

*Chapter 2 Description of Alternatives, Including
Proposed Action:
Alternative B- Proposed Action:*

produced water into the reserve pits in accordance with the Oil and Gas Onshore Order No. 7, water disposal regulations.

Garbage and other waste debris will be contained in portable wire mesh trash cages, and will be removed upon completion and disposed of at a Wyoming Department of Environmental Quality (WDEQ) approved disposal site. Self-contained portable chemical toilets will be used for human waste containment. All sewage and waste disposal will be conducted in strict accordance with applicable state and local rules and regulations.

Drilling Operations: The operator will construct the reserve pits on the cut portion of the well sites, and will maintain a minimum of two feet of freeboard. A permanent marker shall be installed in the reserve and/or completion pits (either on the liner or using some other means that does not impair the integrity of the liner) that identifies the level at which two feet of freeboard remains in the pits. Produced water from a newly completed well may be temporarily disposed into the reserve pits for up to 90 days. Prior to the end of the 90 days, the operator shall submit a Sundry Notice for approval of a permanent water disposal method. The only materials allowed to be disposed in the pits are wastes that are generated by and are intrinsic to oil/gas exploration, development, and production activities.

After cessation of drilling and completion operations, any visible or measurable layer of oil must be removed from the surface of the reserve pits and the pits kept free of oil. Prior to reclamation of the reserve pits, an onsite shall be held between the operator and BLM to determine pit closure procedures. In addition, a composite sample of the cuttings shall be analyzed using the Toxic Characteristic Leachate Procedure (TCLP) (See 40 CFR Part 261 Appendix II) for the presence of heavy metals. The sample shall also be tested for chlorides and Total Petroleum Hydrocarbons (TPH). If the analysis shows any toxicity levels above regulatory levels established by the Environmental Protection Agency (EPA) or the State Department of Environmental Quality (DEQ), a plan for disposal and/or treatment of the cuttings shall be submitted to the Administrative Officer for approval.

Facilities: The reserve pits will be lined with a minimum 12-mil synthetic liner. The reserve pit areas will be fenced and maintained until the pits are reclaimed. All temporary tank batteries and facilities designed to contain fluids will be surrounded by an impervious dike designed to contain 110% of the contents of the largest vessel should a leak or spill occur. All pipelines and other load lines will terminate within the bermed area. All long-term above ground production facilities will be painted the color *Covert Green* 18-0617 TPX.

Health and Safety Practices: To minimize undue exposure to hazardous situations, and provide for the health and safety of workers, the operator will comply with all existing applicable rules and regulations (for example, Onshore Orders, Occupational Safety and Health Administration (OSHA) requirements, Resource Conservation and Recovery Act (RCRA), and others), that preclude the public from entering hazardous areas, and place warning signs alerting the public, as required by the BLM.

Surface Reclamation: The operator's APD include reclamation plans within the Surface Use Plan of Operations. These plans will meet the interim and final reclamation objectives of Chapter 6 of The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Fourth Edition (The Gold Book, 2007).

Once construction activities are complete, the operator is required to begin reclamation, which involves reclaiming all portions of the project area not needed for production. The portions of the

construction area not needed for operational and safety purposes are to be re-contoured to a final or intermediate contour that blends with the surrounding topography as much as possible.

The disturbed areas shall be scarified, topsoil shall be re-spread evenly over areas not needed for all-weather operations, and the area seeded with a certified noxious weed free, BLM approved, seed mix of native species appropriate for the site (Exhibit “B”, Surface Use Plan COA). Any topsoil and spoil piles set aside shall be re-vegetated to prevent the soil from eroding, and to help maintain its biological viability (The Gold Book, 2007). In addition, all rat and mouse holes shall be backfilled and compacted immediately after well completions, and the reserve pit shall be dried and backfilled.

On slopes greater than 3:1, erosion blankets or mats will be required. Weed-free straw or hay will be placed and crimped in to the soil for slopes less than or equal to 3:1. The disturbed area will be seeded with a certified noxious weed free, BLM approved, seed mix of native species appropriate for the site (Exhibit “B”, Surface Use Plan COA). Any topsoil and spoil piles set aside will be required to follow the same methods as on the reclaimed areas to prevent the soil from eroding and to help maintain its biological viability (The Gold Book, 2007).

If during interim reclamation, noxious or invasive plants become established, the operator will be responsible for developing an eradication plan. This will include a comprehensive approach such as Integrated Pest Management (IPM). If chemicals are necessary, the operator will be required to obtain a Pesticide Use Proposal (PUP) with BLM authorization. To achieve final reclamation, the site must be re-contoured to the original contour or a contour that blends with the surrounding landform, stockpiled topsoil redistributed, and the site re-vegetated as stated above.

To achieve final reclamation of a formerly producing well, all topsoil and vegetation must be re-stripped from all portions of the old well site that was not previously reshaped to blend with the surrounding contour and seeded as stated above. Gravel and similar materials must be removed from the well location or buried deep in the re-contoured cut. The entire well location shall be fenced following seeding until rehabilitation has been completed. Final road reclamation includes re-contouring the road back to the original contour, seeding, and any other techniques that will be helpful to improving reclamation success (The Gold Book, 2007). Weeds shall be controlled on all disturbed areas within the exterior limits of the permit during the life of the project. Weed control methods shall be in accordance with guidelines established by the EPA, BLM, or appropriate authorities.

2.3. Alternatives Considered, But Eliminated From Further Analysis:

Onsite field examinations were held and alternative well locations were identified. However, the alternative locations would result in greater surface disturbance than the Proposed Action, or would not offer additional protection of the resources than the applied common to all Design Features would provide.

The wells have been placed in optimal geographic locations so that existing roads, pipelines, and other disturbances can be utilized to the greatest extent possible in an attempt to reduce the need for new surface disturbance and to centralize disturbance corridors. All suitable alternatives examined at the field review have been incorporated into the Proposed Action. Therefore, the only alternatives considered further in this assessment are the Proposed Action and the No Action Alternative.

*Chapter 2 Description of Alternatives, Including
Proposed Action:
Alternatives Considered, But Eliminated From
Further Analysis:*

2.4. Summary of Impacts:

Table 2.2. Summary of Impacts to Affected Resources from Each Alternative

Resource	No Action	Proposed Action
Climate and Air Quality	Continuing Trends	Truck, Equipment and Drilling Rig Emissions
Soils	Continuing Trends	Topsoil Removal and Soil Compaction
Vegetation	Continuing Trends	Vegetation Removal and Compaction
Wildlife Including BLM Special Status Species	Continuing Trends	Habitat Loss and Disruptive Activities

This page intentionally
left blank

Chapter 3. Affected Environment and Environmental Impacts:

This page intentionally
left blank

3.1. Introduction:

This section describes the current conditions, organized by resources, as identified in Section 1.7, Identification of Issues that could be affected by the Proposed Action and the No Action Alternative.

3.1.1. General Setting:

The proposed project area is located in the Beaver Creek Unit, approximately 14 miles southeast of Riverton, Wyoming. This area lies within the Wyoming Basin Eco-region, Rolling Sagebrush Steppe. This eco-region is a broad arid intermontane basin interrupted by hills and low mountains and dominated by grasslands and shrub lands. Primary uses in the area are mineral exploration and production, utility corridors, livestock grazing and wildlife habitat. Much of the region is used for livestock grazing, although many areas lack sufficient forage to support this activity. The region contains major natural gas and petroleum producing fields (Chapman et al, 2004).

The project will be located within mineral leases WYC-048239 and WYC-048241, and includes a proposal for the drilling of two oil wells. The best available data (Wyoming Oil and Gas Conservation Commission, 2014) indicate that there are currently 92 producing conventional natural gas wells, 21 producing oil wells, 20 producing coal bearing natural gas (CBNG) wells, 16 CO₂ injection wells, four water disposal wells, two H₂S injection wells, four central production facilities, and 22 temporarily abandoned or shut-in wells within. The Beaver Creek Unit also contains the Beaver Creek Gas Plant and an extensive network of roads, pipelines and power lines.

3.1.2. Resources/Issues Brought Forward for Analysis:

The level of resources presented are ordered and addressed in the same order presented in Chapter 1. Resources that are not impacted and are not of concern in the project area are not discussed.

3.1.3. General Impact Analysis Assumptions and Guidelines:

This section is based on the resource specialists' reports and provides the analytical basis for comparison of the alternatives. The section organizes the resources as identified in Chapter 1.0, Section 1.7 Identification of Issues, and compares the general current conditions to impacts between the Proposed Action and No Action Alternative. Design Features identified in Chapter 2.0, Section 2.2.2.1 have been incorporated into the analysis as a means to reduce or eliminate adverse impacts and will be discussed in further detail.

Impacts have been categorized according to the phase of development and duration of activities on the resources. Temporary impacts are defined as impacts that occur during construction and drilling operations (30 to 45 days). Short-term impacts are defined as impacts to the resources that persist after construction operations have been completed, and remain until interim reclamation has been successfully achieved. Short-term impacts could last three to five years or until reclamation standards are achieved. Long-term impacts are defined as the duration of the wells' operating lives (20+ years).

Impacts are also categorized as being direct or indirect, and beneficial or adverse. This analysis identifies these types of impacts and compares the alternatives accordingly.

Direct impacts are those that are caused by the action and occur at the same time and place. Indirect impacts are those impacts which are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable. Sometimes it is difficult to separate these impacts, and so the impacts may be described together.

3.1.4. Cumulative Impacts:

Cumulative impacts refer to impacts on the environment which result from the incremental impacts of the Proposed Action when added to other past, present and reasonably foreseeable future actions. The Cumulative Impacts Analysis Area (CIAA) and Cumulative Impacts Temporal Boundary (CITB) may be different for each resource and will be defined accordingly.

The best available data (Wyoming Oil and Gas Conservation Commission, 2014) indicate that there are currently 92 producing conventional natural gas wells, 21 producing oil wells, 20 producing coal bearing natural gas (CBNG) wells, 16 CO₂ injection wells, four water disposal wells, two H₂S injection wells, four central production facilities, and 22 temporarily abandoned or shut-in wells within the Beaver Creek Unit. The Beaver Creek Unit also contains the Beaver Creek Gas Plant and an extensive network of roads, pipelines and power lines.

Using an average of approximately six acres of surface resource disturbance for each well project (well pad/access road/pipeline), the cumulative impacts from oil and gas development to date in the Beaver Creek Unit amount to approximately 1086 acres of disturbance. The Beaver Creek Unit has an area of 16,526 acres (Wyoming Oil and Gas Conservation Commission, 2014). The cumulative impacts of past and potential new oil and gas development amount to a total of approximately 1095 acres of disturbance. The level of expected development activity outside of the Proposed Action is not available. This authorization would result in approximately 8.7 acres of short-term (three to five years) disturbance and 5.8 acres (20+ years) disturbance to surface resources.

3.2. Climate, Climate Change and Air Quality:

3.2.1. Description of Climate, Climate Change and Air Quality Resources:

Climate: The project area is located in a semi-arid (dry and cold), mid-continental climate regime. The area is typified by dry, windy conditions with limited rainfall, and long, cold winters.

The nearest meteorological monitoring station is located in Riverton, Wyoming, approximately 14 miles northwest of the project area. The annual average total precipitation in Riverton from 1981 to 2010 was 8.74 inches. Precipitation is greatest from spring to summer, tapering off during the fall and winter months. An average of 33.9 inches of snow falls during the year, with the majority of the snow distributed evenly between November and April (Western Regional Climate Center, 2014).

The region has cool temperatures, with average temperatures (in degrees Fahrenheit) ranging between 1.8°F and 30.7°F in January, and between 52.6°F and 88.7°F in July. The frost-free period generally occurs from May to September. Figure 3.1 shows the mean monthly temperature ranges and total precipitation amounts for Riverton (Western Regional Climate Center, 2014).

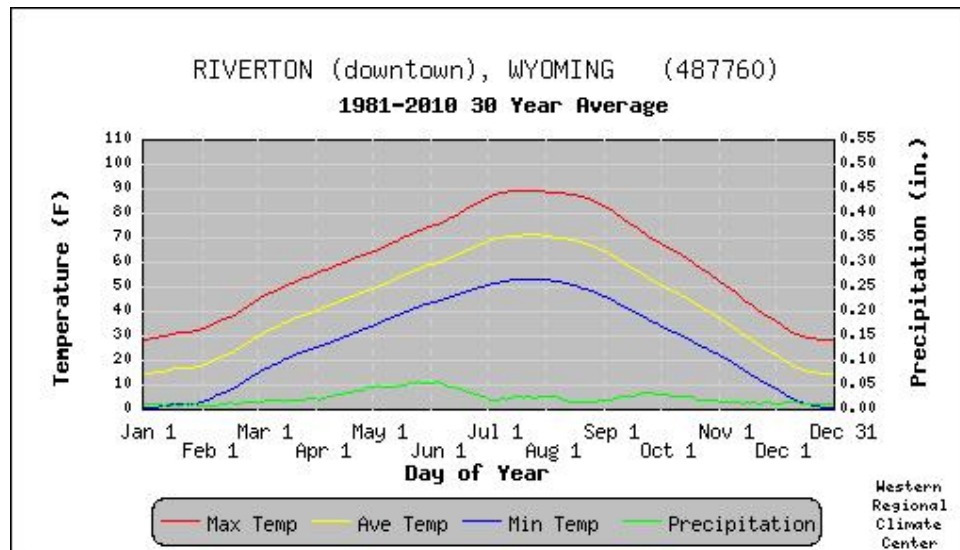


Figure 3.1. Mean Monthly Temperature Ranges and Total Precipitation Amounts

Max. Temp. is the average of all daily maximum temperatures recorded for the days of the year between the years 1981 and 2010.

Ave. Temp. is the average of all daily average temperatures recorded for the days of the year between the years 1981 and 2010.

Min. Temp. is the average of all daily minimum temperatures recorded for the days of the year between the years 1981 and 2010.

Precipitation is the average of all daily total precipitation recorded for the days of the year between the years 1981 and 2010.

Climate Change: There is substantial scientific evidence that average global temperatures are increasing due to atmospheric concentrations of Greenhouse Gases (GHG), as well as land use changes. This warming is associated with climatic variability that exceeds the historic norm (climate change). Observed temperature increases in northern latitudes have been greater than those in other areas, and seasonal low temperatures are generally increasing faster than high temperatures. Other unevenly distributed effects of climate change include altered weather patterns, sea levels, precipitation rates, wildfire occurrences, seasonal timing, desert distribution, and plant and animal distribution. Existing climate prediction models are global in nature. Therefore, they are not at the appropriate scale to estimate potential impacts of climate change on the project area.

A growing body of evidence indicates that Earth's atmosphere is warming. Records show that surface temperatures in the Wyoming region have risen approximately 1.5 degrees Fahrenheit since the 1960 to 1979 baseline years (GCRP, 2009b). The largest increase in average temperature has occurred in the winter months in the northern portions of the region. Relatively cold days in the region are becoming less frequent, and relatively hot days are becoming more frequent (GCRP, 2009b). Observed changes in oceans, ecosystems, and ice cover are consistent with this warming trend (National Academy of Sciences, 2006).

Concentrations of certain gases in Earth's atmosphere have been identified as being effective at trapping heat reflected off Earth's surface, thereby creating a "greenhouse effect." As concentrations of GHG increase, Earth's surface warms, the composition of the atmosphere changes and global climate is affected. Concentrations of GHG have increased dramatically in Earth's atmosphere in the past century. These increases, particularly in carbon dioxide (CO₂), nitrous oxide (N₂O), and fluorinated gases, have been attributed to man-made sources and human activities (EPA, 2010a).

Climate change is likely to combine with other human-induced stressors to further increase the vulnerability of ecosystems to other pests, invasive species, and loss of native species. Climate change is likely to affect breeding patterns, water and food supply, and habitat availability to some degree. Special Status Species in the planning area, such as greater sage-grouse, which are already stressed by declining habitat, increased development and other factors, could experience additional pressures as a result of climate change.

Air Quality: In the surrounding geographic area, air quality is currently impacted by exhaust from drilling rigs, heavy trucks and heavy dirt moving equipment associated with oil and gas operations, as well as production of pollutants associated with production and processing of natural gas (i.e. flaring and gas plant operations). The extent to which these factors may impact air quality on any given day is dependent primarily on production activity, wind conditions, topography, and soil moisture levels. Some degree of air movement across the project area is usually evident.

The closest comprehensive wind measurements are collected at the Riverton Airport meteorological monitoring station, approximately 14 miles northwest of the project area. The average wind speed at the Riverton Airport from 1996 to 2006 was 8.6 mph and the prevailing direction was west-southwest (Western Regional Climate Center, 2014). The open rolling topography and near constant wind prevent the buildup of stagnant air in the project area, but the wind also tends to accelerate the drying of disturbed soil and contributes to the creation of dust.

3.2.2. Impacts to Climate, Climate Change, and Air Quality under Alternative A- No Action:

3.2.2.1. Direct and Indirect Impacts:

The No Action Alternative would result in continuing trends of climate and air quality resource conditions.

3.2.2.2. Cumulative Impacts:

The No Action Alternative would result in continuing trends of climate and air quality resource conditions.

*Chapter 3 Affected Environment and Environmental
Impacts:*

*Impacts to Climate, Climate Change, and Air Quality
under Alternative A- No Action:*

3.2.3. Impacts to Climate, Climate Change, and Air Quality under Alternative B- Proposed Action:

3.2.3.1. Direct and Indirect Impacts:

Climate and Climate Change: A variety of activities in the project area currently generates Greenhouse Gases (GHG). Fuels combustion, industrial processes and any number of other activities on public lands result in direct emissions of GHG. Direct emissions in the planning area include those related to current and ongoing oil and gas and other minerals development, fire events, motorized vehicle use (e.g. OHV), livestock grazing, facilities development, and other fugitive emissions. Indirect GHG emissions in the planning area include the demand for electricity outside the area. If authorized by the BLM, the Proposed Action would result in additional GHG emissions.

In general, the largest sources of GHG emissions in the oil and gas sector are CO₂ emissions from natural gas compressors and drill rig engines, and fugitive CH₄ emissions from wellhead equipment, pneumatic devices and tanks. Emissions occur from well drilling and completion, road and well pad construction, flaring and venting, compressor operations, dehydrator and separator operations, tank venting and loadout, well head fugitives, pneumatic device operations, and vehicle traffic.

An attempt to analyze the impacts of GHG emissions and other climate change factors that result from the ultimate consumption of the resources produced from the project area would be a highly speculative exercise unnecessary for the land management decisions for which the BLM is responsible. The BLM does not dictate the destination of the resource produced from federal lands. The effects from consumption are not only speculative, but beyond the scope of agency authority or control.

Air Quality: Temporary (30 to 45 days) adverse impacts to air emissions would be expected from truck and drilling rig activities. The Proposed Action would also have direct and indirect impacts to these resources depending on the type of activities.

Temporary impacts to air emissions would occur from construction operations, including use of temporary generators in the project area, and would continue as long as equipment, vehicles and trucks are needed to operate, maintain and reclaim the location. These impacts to air quality would be from both fugitive dust and emissions.

Fugitive dust is basically air born particles resulting from heavy equipment and vehicle traffic being in contact with the soil surface. The effects of fugitive dust on air quality would be minimized through dust abatement practices, as discussed in the Design Features in Chapter 2. Emissions caused by trucks and heavy equipment include the following particles:

1. particles 10 micrometers and smaller in diameter (PM₁₀);
2. sulfur dioxide (SO₂);
3. nitrogen oxides (NO_x);
4. carbon monoxide (CO); and
5. volatile organic compounds (VOC).

Some temporary impacts on air quality in the immediate vicinity of the project would be caused by particulate matter and exhaust from vehicles and equipment. These impacts would be local and would likely be dispersed by prevailing winds.

3.2.3.2. Cumulative Impacts:

Climate and Climate Change: Climate change is a global phenomenon impacted by human activities and natural changes around the Earth and the surrounding atmosphere. Analysis of impacts to such a large scale process is beyond the scope of this EA. Because the project area lies within an established oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions are expected to increase emissions of Greenhouse Gases in the surrounding area. The Proposed Action would add incrementally to the cumulative impacts to climate change in the CIAA. Initial impacts during the construction stages from trucks and equipment would be the most pronounced, but these would decrease rapidly after construction activities are completed.

Air Quality: The CIAA for air quality is the area within 100 km of the project area. The CITB for air quality in the area is the time period required for drilling of the wells (30 to 45 days). Because the project area lies within an established oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present, and reasonably foreseeable future actions are expected to increase emissions of pollutants in the surrounding area. The Proposed Action would add incrementally to the cumulative impacts to air quality in the CIAA. Initial impacts during the drilling and construction stages from trucks and equipment would be the most pronounced, but these would decrease rapidly after drilling and construction activities are completed.

3.3. Soils:

3.3.1. Description of Soil Resources:

The proposed project is located primarily on two soil units as defined in the Soil Survey of Fremont County, East Part of Dubois Area, Wyoming, July, 1993 Issue. The BCU No. 9-43 is located on the Absher-Elkol complex, zero to four percent slopes, map unit. The BCU No. 15-31 is located on the Badland-Seaverson-Blazon complex, steep, map unit.

3.3.1.1. Absher-Elkol Complex:

The Absher-Elkol complex, zero to four percent slopes, map unit is composed of Absher loam, one to four percent slopes, and Elkol silty clay loam, zero to three percent slopes. The map unit is on terraces. The soils are very deep and well-drained, with slow to very slow permeability. The hazard of water erosion is slight to moderate, and the hazard of wind erosion is moderate for these soils (USDA, 1993).

3.3.1.2. Badland-Seaverson-Blazon Complex:

The Badland-Seaverson-Blazon complex, steep, map unit is composed of Badland, Seaverson clay loam, six to 30 percent slopes, and Blazon clay loam, six to 40 percent slopes. The map unit is on hills and ridges. The Seaverson and Blazon soils are shallow and well drained, with slow

permeability. The hazard of water erosion is severe, and the hazard of wind erosion is moderate for these soils.

3.3.2. Impacts to Soils under Alternative A- No Action:

3.3.2.1. Direct and Indirect Impacts:

The No Action Alternative would result in continuing trends of soil resource conditions.

3.3.2.2. Cumulative Impacts:

The No Action Alternative would result in continuing trends of soil resource conditions.

3.3.3. Impacts to Soils under Alternative B- Proposed Action:

3.3.3.1. Direct and Indirect Impacts:

Direct adverse impacts to soil resources result primarily from actions that remove vegetative cover, compact soil, reduce infiltration, create changes in physical and biological properties, reduce organic matter content, and increase the potential for accelerated erosion by exposing soil particles to wind and water. Disrupting natural soil horizons and removing vegetation to construct the well locations and drill the wells cause a loss of soil productivity.

The direct impacts would be greatest upon the initiation of construction and disturbance associated with the well pad locations, access roads and pipeline corridors. Additional disturbance occurs to the subsoil during construction activities and drilling of the wells. These actions could result in mixing of the topsoil and subsoil horizons and destroying the structure of the soil that is required to have a functional matrix for soil fertility and hydrologic capacity. Initially, a total of approximately 8.7 acres of soils on BLM land would be disturbed.

The Absher-Elkol and Seaverson-Blazon soils are considered to have Limited Reclamation Potential (LRP). LRP areas are those defined by BLM Wyoming as having the most extreme reclamation challenges. These areas are often characterized by highly sensitive and erosive soils, highly sensitive vegetation types with severe physical or chemical limitations, steep slopes, etc. Design Features described in Section 2.2.2.1, such as water bars and erosion control devices, stockpiling the topsoil and spoil piles separately, and reseeding with a soil stabilizing native seed mix, will help mitigate adverse environmental impacts to LRP soil resources.

The disturbances to soils and the removal of cover vegetation could result in accelerated rates of water erosion in the Seaverson-Blazon soils, which are rated severe for water erosion (See Section 3.3.1). Equipment traffic may create localized areas of soil compaction, decreasing infiltration rates, which could compound the effects of erosion and runoff into the watershed.

Topsoil and subsoil materials could be mixed during construction and subsequent activities, resulting in less fertile soils and a lack of a viable seed bank. Mixed soil materials decrease the likelihood of successful re-vegetation, whether natural or reclaimed.

The potential exists for contamination of soil from fluids associated with heavy equipment, reduction in industrial hygiene and safe working environment for employees. The potential exists

for chemicals to be transported, used, and temporarily stored in the project area, creating the potential for soil contamination should chemicals be used in an improper manner or in the event of an accidental spill or inappropriate release.

These impacts would be expected to be temporary during construction related activities, and until successful interim reclamation has occurred. The short-term (three to five years) disturbance to soils resulting from construction of the well locations and associated facilities would be 8.7 acres on BLM land. Upon successful interim reclamation, 5.8 acres of disturbance to soils would remain for the duration of the wells' operating lives (20+ years).

Reclamation methods and standards, such as installing water bars and erosion control features, stockpiling the topsoil and soil piles separately, and reseeding with a soil stabilizing native seed mix as described in Section 2.2.2.1, Design Features of the Proposed Action, would effectively reduce impacts to the soil resource. Short-term impacts are unavoidable, but improved reclamation techniques have reduced the long-term impacts to an acceptable level.

3.3.3.2. Cumulative Impacts:

The CIAA for soil resources is the surrounding Beaver Creek Unit (16,526 acres). The CITB for soil resources is the time period required for successful reseeding and reclamation of the disturbed area (three to five years). Most of the cumulative impacts to soils in oil and gas fields are a result of the need for road running surfaces, production facilities and producing well site activities. These activities have an incremental impact to the existing disturbance. Because the project area lies within an established oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions would be expected to impact soils in the surrounding area. The additional increase in impacts from the Proposed Action is small considering the project adds 8.7 acres of short-term (three to five years) disturbance to the surrounding area.

3.4. Vegetation, Including Noxious/Invasive Plants:

3.4.1. Description of Ecological Sites and Potential Vegetation:

3.4.1.1. Absher-Elkol Complex Ecological Site Description:

The ecological site associated with the Absher-Elkol complex, zero to four percent slopes, map unit is the Saline Lowland, 10 to 14-inch precipitation, High Plains Southeast range site.

Potential vegetation in the Saline Lowland, 10 to 14-inch High Plains Southeast range site includes alkali sacaton, basin wildrye, western wheatgrass, Indian ricegrass, Gardner saltbush and winterfat. Species such as greasewood and annual forbs will increase in abundance as range conditions deteriorate. Potential production by weight (air-dry) of the desirable plant community ranges from 1,200 pounds per acre in unfavorable years, to 2,500 pounds per acre in favorable years for these soils (NRCS, 2014).

*Chapter 3 Affected Environment and Environmental
Impacts:
Vegetation, Including Noxious/Invasive Plants:*

3.4.1.2. Badland-Seaverson-Blazon Complex Ecological Site Descriptions:

The ecological sites associated with the Badland-Seaverson-Blazon complex, steep, map unit include the Saline Upland 10 to 14-inch, High Plains Southeast range site, and the Shallow Clayey, 10 to 14-inch, High Plains Southeast range site.

Potential vegetation in the Saline Upland, 10 to 14-inch, High Plains Southeast range site includes western wheatgrass, Indian ricegrass, bottlebrush squirreltail, Gardner saltbush and winterfat. Species such as greasewood and annual forbs will increase in abundance as range conditions deteriorate. Potential production by weight (air-dry) of the desirable plant community ranges from 300 pounds per acre in unfavorable years, to 650 pounds per acre in favorable years for these soils (NRCS, 2014).

Potential vegetation in the Shallow Clayey, 10 to 14-inch High Plains Southeast range site includes bluebunch wheatgrass, western wheatgrass, Indian ricegrass, bottlebrush squirreltail, big sagebrush, Gardner saltbush and winterfat. Species such as Sandberg bluegrass, big sagebrush and annual forbs will increase in abundance as range conditions deteriorate. Potential production by weight (air-dry) of the desirable plant community ranges from 500 pounds per acre in unfavorable years, to 1,000 pounds per acre in favorable years for these soils (NRCS, 2014).

Noxious/Invasive Plants: A number of invasive, non-native and noxious species occur in the geographic region surrounding the project, and may already be established in the project area itself. Species such as halogeton, Russian knapweed, and cheatgrass have the capability to dominate a site if appropriate weed abatement action is not taken.

3.4.2. Impacts to Vegetation under Alternative A- No Action:

3.4.2.1. Direct and Indirect Impacts:

The No Action Alternative would result in continuing trends of vegetation resource conditions.

3.4.2.2. Cumulative Impacts:

The No Action Alternative would result in continuing trends of vegetation resource conditions.

3.4.3. Impacts to Vegetation under Alternative B- Proposed Action:

3.4.3.1. Direct and Indirect Impacts:

General Vegetation: Direct impacts include vegetation removal, topsoil loss and compaction, disturbance of biological soil crusts, and increased fugitive dust. Surface disturbance and construction activities associated with installation of the wells would account for 8.7 acres of short-term (three to five years) disturbance to BLM lands. After successful interim reclamation, which may require three to five years for vegetation to re-establish, no long-term disturbance resulting from this project would remain for the duration of the wells' operating lives (20+ years).

Remaining vegetation will re-grow and disturbed areas will be reclaimed to BLM standards as described in the project Design Features identified in the COA. Wyoming standard mitigation guidelines, lease stipulations, and decisions in the Lander RMP (BLM, 1987) associated with air quality, soils, surface water, groundwater, vegetation, interim reclamation and dust abatement, would effectively minimize the impacts to vegetation.

Reclamation of surface disturbance will occur following the installation of the wells. Areas not needed for production operations will be re-contoured and scarified to break up any soil compaction. Afterwards, topsoil will be replaced and seeded with a seed mixture agreed to by the operator and the BLM. All seed will be weed-free and tested in accordance with applicable state law to eliminate the potential for introduction of weeds. The seed drilling method will be implemented with the contour of any slopes to reduce the risk of erosion. To provide further soil stabilization, any remaining topsoil and spoil material not used for interim reclamation should be seeded using a hydro-seed and/or hydro-mulch method. The operator will also fence the disturbed areas until successful rehabilitation has occurred to prevent additional surface disturbance. Prior to final reclamation, the operator will contact the BLM for a final approved seed mixture for the site.

Under the Proposed Action, there will be no direct disturbance to existing wetland ecological sites. Construction, operation, abandonment, and reclamation actions will avoid these isolated wetlands ecological sites. Potential surface runoff and sedimentation, topsoil loss and compaction, and disturbance of biological soil crusts from disturbed ecological sites will be minimized through the implementation of appropriate erosion control measures found in the project Design Features. Increased vehicle traffic on existing access routes, especially during dry periods, will be the primary source of fugitive dust settling on roadside vegetation. Project Design Features to minimize fugitive dust in the project area will be implemented.

Special Status Species: The BLM Wildlife Biologist determined that no suitable habitat for BLM Wyoming Special Status Plant Species exists in the project area.

Noxious/Invasive Plants: The Proposed Action would increase the likelihood of noxious and invasive weeds being introduced to the project area. The disturbance associated with installation of the wells provides a mode for weed seed transportation and an opportunity for weed establishment. These species are likely to become established within the project area, especially in disturbed soils or newly reclaimed areas. Potential sources of weed seed include vehicles traveling to and from the well site, dormant seeds on site, straw used for mulching, and commercial seeds for reclamation that may not be totally weed-free. Weed seed is also spread by birds, wind and water, and can become attached to the fur of grazing herbivores and transported as animals move.

A number of invasive, non-native and noxious species occur in the geographic region surrounding the project, and may already be established in the project area. Reclamation efforts may take several years to establish native plant species. With a lack of competition from native perennials, there is expected to be an increase in early seral stage plant species such as halogeton, ensuring a seed source for invasive species to become established with each new disturbance. These early seral stage plants offer little in the way of palatability to livestock or wildlife, and without proper weed abatement action, can dominate the site of disturbance and spread to the surrounding rangelands.

Direct impacts include damage to or loss of individual plants, loss of habitat or habitat quality, loss of pollinators and loss of seed banks. Direct plant mortality, habitat loss, and the spread of Invasive Non-Native Species (INNS) can result from surface disturbance associated with oil and gas development activities. Indirect impacts include the loss of suitable habitat for future

Chapter 3 Affected Environment and Environmental

Impacts:

Impacts to Vegetation under Alternative B- Proposed

Action:

colonization. Surface disturbing activities can also indirectly impact sensitive plant species by contributing to soil erosion and transporting INNS into sensitive plant habitat.

3.4.3.2. Cumulative Impacts:

The CIAA for vegetation is the surrounding Beaver Creek Unit (16,526 acres). The CITB for vegetation resources is the time period required for successful reclamation to occur (three to five years). The Proposed Action would add incrementally to adverse cumulative impacts on vegetation. Because the project area lies within an established oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions are expected to impact vegetation resources in the surrounding area. These actions include disturbances associated with well pads, access roads and pipelines. Most of the cumulative impacts to vegetation are a result of the need for vegetation removal and construction related activities, which compact the soils, making water infiltration low and plant establishment unlikely.

In addition, due to the low precipitation and soil types in this area, reclamation of disturbed areas to a pre-disturbance state may take more than ten years (in the case of big sagebrush and other woody species). Areas reclaimed after construction activities have been completed will most likely be dominated by halogeton and other early seral stage species. These species are capable of stabilizing the soil against wind erosion and small precipitation events. However, these species lack the root mass and depth to protect soils against heavy precipitation events, and thus, these sites are open to blowouts in the event of heavy rain and strong gusting wind.

3.5. Wildlife, Including BLM Wyoming Special Status Species:

3.5.1. Description of Wildlife Resources:

3.5.1.1. General Wildlife:

The project area is located in the Rolling Sagebrush Steppe of the Wyoming Basin Eco-region (Chapman et al., 2004). As such, it is typically inhabited by small mammals such as ground squirrels, prairie dogs, and various other rodents, rabbits, and burrowing species. The project area may also include various small bird species. These lesser species are, in turn, preyed upon by larger carnivores such as fox, coyote, badger, and skunk and by raptor species such as golden eagles and various hawks. In addition, the project area may be used by larger species, such as pronghorn antelope and mule deer (Wildlife Clearance, Exhibit "D").

3.5.1.2. BLM Wyoming Special Status Species:

Greater Sage-Grouse: The proposed project does not lie within BLM Wyoming Designated Greater Sage-Grouse Core Area. However, the project areas do contain suitable habitat for greater sage-grouse. It is the policy of Wyoming BLM (Instruction Memorandum No. WY-2012-019) to manage greater sage-grouse seasonal habitats and maintain habitat connectivity to support population objectives set by the Wyoming Game and Fish Department.

Greater sage-grouse populations have been declining across the western United States, prompting several petitions to list them as threatened under the Endangered Species Act (ESA). In March

of 2010, the U.S. Fish and Wildlife Service (USFWS) determined that the greater sage-grouse warranted listing as a threatened species under the ESA, but precluded listing due to higher priority actions. Threats to greater sage-grouse include degradation, loss, and fragmentation of habitat, predation, West Nile Virus, and human disturbance during sensitive periods. Energy exploration and development within the Beaver Creek Unit impact greater sage-grouse habitat as a result of roads, well pads and construction related activities. The net result is that greater sage-grouse habitat is fragmented by wells, facilities, roads, pipelines, and utilities associated with these new and existing developments.

Management will focus on maintaining sagebrush and understory diversity in habitat for greater sage-grouse and other sagebrush obligate species unless vegetative treatments are needed to achieve habitat objectives. Because greater sage-grouse is one of the largest and most visible Special Status bird species, it is typically used as an indicator species for other sagebrush obligate birds and small mammals. Therefore, management actions that protect greater sage-grouse habitat will generally have beneficial impacts on all sagebrush obligate species.

Migratory Birds and Sagebrush Obligates: The BLM Wildlife Biologist has determined that the project areas lie within suitable habitat for migratory birds and BLM Wyoming Special Status sagebrush obligate bird species, sage sparrow, Brewer's sparrow, sage thrasher and loggerhead shrike. These species occupy sagebrush, basin-prairie shrub lands and mountain foothill shrub lands.

Raptors: The BLM Wildlife Biologist has determined that the BCU 15-31 location lies within suitable habitat for raptors. These species occupy cliff sites, rock outcrops, shrub lands and grasslands.

Mule Deer and Pronghorn Antelope: The BLM Wildlife Biologist has determined that the project areas lie within Crucial Winter Range for mule deer and pronghorn antelope. Winter is a stressful time for wild ungulates due to snow depths, forage availability and cold temperatures. Therefore, Crucial Winter Range, which typically provides more food and cover during the winter months than other areas, is often the focus of management for big game populations. Mule deer and pronghorn antelope inhabit a variety of open rangeland types and forage primarily on shrubs, especially sagebrush species.

3.5.2. Impacts to Wildlife Species under Alternative A- No Action:

3.5.2.1. Direct and Indirect Impacts:

The No Action Alternative would result in continuing trends of wildlife resource conditions.

3.5.2.2. Cumulative Impacts:

The No Action Alternative would result in continuing trends of wildlife resource conditions.

3.5.3. Impacts to Wildlife Species under Alternative B- Proposed Action:

3.5.3.1. Direct and Indirect Impacts:

General Wildlife:

Impacts to wildlife species are generally described as the loss, degradation or fragmentation of habitat or key habitat features, the disturbance/disruption of wildlife during sensitive time periods, or direct animal mortality. Adverse impacts from mineral exploration and development include the displacement of wildlife in developed areas, wildlife avoidance of areas around development from noise and human presence, the reduction in usable habitat, and the disruption of migration corridors that link seasonal ranges. Increases in vehicular traffic are expected to have temporary (approximately 30 to 45 days) impacts on wildlife. To minimize the impacts of habitat loss for some species, all areas will be reclaimed to BLM standards. If the wells are produced, interim reclamation will be required according to the Design Features described in Chapter 2.

The principal short-term direct impacts to wildlife likely to be associated with the Proposed Action would include the loss of certain wildlife habitats due to the development of drilling and construction operations, habitat fragmentation, displacement of some wildlife species, and an increase in the potential for collisions between wildlife and motor vehicles. Project-related surface disturbance, facilities, and human activity would reduce available habitat both by loss and fragmentation. Temporary or construction-phase (30 to 45 days) disturbance on BLM surface associated with the proposed project will be approximately 8.7 acres. Direct impacts to wildlife could include the loss of potential nesting, wintering, and foraging habitats. If construction were to occur during the spring/summer months, the proposed project could result in reproductive failure (nest/burrow abandonment, and mortality of eggs or young).

Long-term impacts would occur from habitat fragmentation associated with roads, utility corridors, construction, and long-term avoidance of development sites and facility locations. Potential impacts to wildlife include disturbance of localized areas, loss of habitat, long-term degradation of habitat, and direct mortality of small mammals or nesting birds. Surface disturbance that results in the loss of sagebrush habitat would have a long-term adverse impact because of the difficulty of establishing shrubs in reclamation areas given the time it takes plants to establish and grow. Due to prolonged reclamation time, oil and gas development in low precipitation areas can result in long-term impacts from habitat loss and fragmentation.

The Proposed Action would allow for the use of open reserve pits, which will be used to contain drilling fluids and other toxic substances. The potential exists for wildlife, migratory birds, and other animals to enter and become entrapped in the reserve pit, and ingest toxic substances. When the reserve pits contain fluids or toxic substances, the operator will provide effective and proven wildlife deterrents or exclusionary devices such as nets, to ensure at all times that wildlife, migratory birds and other animals are not adversely impacted. Any open pits will be fenced to deter and prevent wildlife, migratory birds and other animals from entering and ingesting substances.

BLM Wyoming Special Status Species:

Greater Sage-Grouse: Direct impacts to greater sage-grouse result from the direct loss of important sagebrush habitat or a key habitat feature such as a nest site or lek area, or from animal

mortality. Surface disturbance that results in the loss of sagebrush habitat will have a long-term adverse impact because of the difficulty of establishing shrubs in reclamation areas given the time it takes plants to establish and grow. Greater sage-grouse can also be directly disturbed by human activities, potentially causing them to abandon a nest, lek or home range. Disturbance during sensitive periods (e.g. winter and breeding) leads to lower recruitment and higher mortality rates, resulting in adverse impacts to the species. Direct impacts to greater sage-grouse could also include mortality from vehicles, fence entanglements or drowning.

Indirect impacts to greater sage-grouse occur by changing habitat characteristics or quality, which can ultimately result in changes in migrations patterns, habitat use, carrying capacity, and long-term population viability. Indirect impacts to greater sage-grouse can also occur when specific actions change the habitat in a way that makes it unsuitable for future habitation. Disturbance impacts can range from short-term displacement and shifts in activities to long-term abandonment of home range.

The Design Features described in Chapter 2.2.2.1 will provide sufficient mitigation and protection measures to reduce adverse impacts to greater sage-grouse.

Migratory Birds and Sagebrush Obligates: Direct impacts to migratory birds and sagebrush obligate bird species result from the direct loss of important habitat or a key habitat feature such as a nest site or from animal mortality. These species can also be directly impacted by human activities, potentially causing them to abandon a nest or home range.

Indirect impacts to migratory birds and sagebrush obligate bird species occur by changing habitat characteristics or quality, which can ultimately result in changes in migrations patterns, habitat use, carrying capacity, and long-term population viability. Disturbance impacts can range from short-term displacement and shifts in activities to long-term abandonment of home range.

Protective measures for migratory birds are provided pursuant to the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, and Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. 668. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act (FWCA), as amended, 16 U.S.C. 661 et seq., and the Fish and Wildlife Act of 1956, as amended, 16 U.S.C. 742a-742j.

Under the MBTA and BGEPA, the BLM has a mandatory obligation to protect the many species of migratory birds, including eagles and other raptors which may occur on lands under its jurisdiction. Measures included in the project Design Features that will reduce or eliminate adverse impacts to migratory birds include protective buffers, seasonal restrictions, and maintenance of habitat within the project area. Protective measures for migratory birds and general wildlife implemented in the Design Features detailed in Chapter 2 pursuant to the MBTA, BGEPA and FWCA will provide mitigation protection in the project area for greater sage-grouse, migratory birds and sagebrush obligate bird species.

Raptors: Direct impacts to raptors result from the direct loss of important habitat or a key habitat feature such as a nest site or from animal mortality. These species can also be directly impacted by human activities, potentially causing them to abandon a nest or home range.

Indirect impacts to raptors occur by changing habitat characteristics or quality, which can ultimately result in changes in migration patterns, habitat use, carrying capacity, and long-term population viability. Disturbance impacts can range from short-term displacement and shifts in activities to long-term abandonment of home range.

*Chapter 3 Affected Environment and Environmental
Impacts:
Impacts to Wildlife Species under Alternative B-
Proposed Action:*

The Design Features described in Chapter 2.2.2.1 will provide sufficient mitigation and protection measures to reduce adverse impacts to raptors.

Mule Deer and Pronghorn Antelope: Direct impacts to mule deer and pronghorn antelope result from the loss of habitat or key habitat features such as winter range or migration corridors. Changing habitat characteristics or quality can cause wildlife to avoid the area, resulting in a loss of available habitat. Oil and gas development fractures vegetative communities, changes plant community structure and diversity, and alter grassland/shrub land landscapes. Mule deer and pronghorn antelope can also be directly impacted by human activities, potentially causing them to abandon a home range. As the numbers of wells, roads, and facilities increase, habitats in and near oil and gas fields become less suitable until most mobile animals no longer utilize these areas.

Indirect impacts to mule deer and pronghorn antelope resulting from oil and gas development include the displacement of wildlife in developed areas, wildlife avoidance of areas around development from noise and human presence, reduction in usable habitat, and the disruption of migration corridors that link seasonal ranges. Indirect impacts to mule deer and pronghorn antelope occur by changing habitat characteristics or quality, which can ultimately result in changes in migration patterns, habitat use, carrying capacity, and long-term population viability. Disturbance impacts can range from short-term displacement and shifts in activities to long-term abandonment of home range. Adverse impacts would be greater in areas experiencing steady development and large amounts of surface disturbance. Surface disturbance that results in the loss of sagebrush habitat would be a long-term adverse impact because of the difficulty of establishing shrubs in reclamation areas due to the time it takes plants to establish and grow.

The Design Features described in Chapter 2.2.2.1 will provide sufficient mitigation and protection measures to reduce adverse impacts to mule deer and pronghorn antelope.

3.5.3.2. Cumulative Impacts:

Greater Sage-Grouse: The CIAA for greater sage-grouse is the project area plus a four-mile buffer. The CITB for greater sage-grouse is the time period required for successful reclamation to occur (three to five years). Proposed and potential development activities within the greater sage-grouse CIAA include oil and gas development and livestock grazing. Project related activities have the potential to remove sagebrush, which could result in the loss of habitat and displacement of prey. Because the project area lies within an existing oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions are expected to impact greater sage-grouse in the surrounding area.

Migratory Birds and Sagebrush Obligates: The CIAA for migratory birds and sagebrush obligate bird species is the project area plus a one-quarter-mile buffer. The CITB for migratory birds and sagebrush obligate bird species is the time period required for successful reclamation to occur (three to five years). Project related activities have the potential to remove sagebrush, which could result in the loss of habitat and displacement of prey. Because the project area lies within an existing oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions are expected to impact migratory birds and sagebrush obligates in the surrounding area.

Raptors: The CIAA for raptors is the project area plus a 20-mile buffer. The CITB for raptors is the duration of the wells' operating lives (20+ years). Project related activities have the potential to result in the loss of habitat and displacement of prey. Because the project area lies within an

existing oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present and reasonably foreseeable future actions are expected to impact raptors in the surrounding area.

Mule Deer and Pronghorn Antelope: The CIAA for mule deer is the Beaver Rim Herd Unit, which has a range of approximately 1,292 square miles. The CIAA for pronghorn antelope is the Beaver Rim Herd Unit, which has a range of approximately 4,111 square miles. The CITB for mule deer and pronghorn antelope is the duration of the wells' operating lives (20+ years). Because the proposed project area is located in an established oil and gas field in a BLM Wyoming Designated Development Area, other BLM and non-BLM past, present, and reasonably foreseeable future actions are expected to impact mule deer and pronghorn antelope Crucial Winter Range Habitat in the surrounding area. The Proposed Action would cumulatively add to the impacts on mule deer and pronghorn antelope, although it would not likely impact the species at a population level.

3.6. Unavoidable Adverse Impacts (All Resources):

NEPA section 102(c) mandates disclosure of “any adverse environmental effects which cannot be avoided should the proposal be implemented.” These are impacts for which there are no mitigation measures or impacts that remain even after the implementation of mitigation measures. Implementation of the Proposed Action would result in unavoidable adverse impacts to some resources.

The CEQ 40 CFR 1500.2(e) defines unavoidable adverse impacts as those that cannot be avoided due to constraints in alternatives. These impacts do not have to be avoided by the planning agency, but they must be disclosed, discussed, and mitigated, if possible.

In general, development and surface disturbing activities, including those from mineral extraction and energy development, would result in unavoidable adverse impacts, including soil compaction and erosion, loss of vegetative cover, spread of INNS, disturbance to and displacement of wildlife, and visual intrusions on the landscape. Conversely, proposed restrictions on some activities, such as OHV use, energy development and livestock grazing, intended to protect sensitive resources and resource values, would result in unavoidable adverse impacts to some users, operators and permittees by limiting their ability to use public lands and potentially increasing their operating costs.

Under NEPA, an agency does not have to avoid adverse impacts, but is required to identify and disclose such impacts. The impacts of the Proposed Action are not considered substantial so an Environmental Impact Statement is not required.

3.6.1. Unavoidable Adverse Impacts Under Alternative A- No Action:

- Failure to produce hydrocarbon products and provide socioeconomic benefits

*Chapter 3 Affected Environment and Environmental
Impacts:
Unavoidable Adverse Impacts (All Resources):*

3.6.2. Unavoidable Adverse Impacts Under Alternative B- Proposed Action:

- Temporary (30 to 45 days) disruptions to wildlife from construction and drilling activities
- Temporary (30 to 45 days) impacts to air quality from truck and drilling rig emissions
- Short-term (three to five years) impacts to soils and vegetation from trucks and drilling rig equipment

3.7. Relationship of Short-Term Uses and Long-Term Productivity (All Resources):

The CEQ establishes (40 CFR 1502.16) that the balance or trade-off between short-term uses and long-term productivity needs to be defined in relation to the activity in question. The decision maker and members of the public need a clear sense of what they are gaining or losing in both the short and long-term. For the purpose of this analysis, the short-term is considered three to five years, whereas the long-term is 20+ years.

3.7.1. Relationship of Short-Term Uses and Long-Term Productivity Under Alternative A- No Action:

The short-term benefits of avoiding disturbance to soils and vegetation would be offset by a lack of hydrocarbon production and socioeconomic benefits.

3.7.2. Relationship of Short-Term Uses and Long-Term Productivity Under Alternative B- Proposed Action:

The short-term adverse impacts of soil compaction and vegetation removal would be offset by hydrocarbon production and positive socioeconomic benefits.

3.8. Irreversible and Irretrievable Commitments of Impacted Resources:

NEPA Section 102(2c) and Section 1502.16 of the CEQ NEPA implementing regulations require that the discussion of environmental consequences include a description of, “any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented.”

Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. Examples of irreversible impacts would be species extinction, ore extraction, and logging of an old growth forest.

Irretrievable commitments are those that are lost for a long period of time. Extraction of oil, gas, sand or gravel would constitute irretrievable impacts because these salable minerals cannot be renewed in the ground within a reasonable time frame.

Impacts from some actions can be both irreversible and irretrievable for some resources. Management actions most likely to result in irreversible and/or irretrievable impacts include those related to development and surface disturbance such as mineral extraction and energy development

3.8.1. Irreversible and Irretrievable Commitments of Resources Under Alternative A- No Action:

Table 3.1. Irreversible and Irretrievable Commitments of Resources Under Alternative A- No Action

Affected Resource	Irreversible Commitment	Irretrievable Commitment
Air Quality	No	No
Soils	No	No
Vegetation	No	No
Wildlife	No	No

3.8.2. Irreversible and Irretrievable Commitments of Resources Under Alternative B- Proposed Action:

Table 3.2. Irreversible and Irretrievable Commitments of Resources Under Alternative B- Proposed Action

Affected Resource	Irreversible Commitment	Irretrievable Commitment
Air Quality	No	No
Soils	No	No
Vegetation	No	No
Wildlife	No	No

Chapter 4. Consultation and Coordination:

This page intentionally
left blank

4.1. Persons, Groups, and Agencies Consulted:

Table 4.1. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Andrew Gibbs	Natural Resource Specialist	Author
Tim Vosburgh	Wildlife Biologist	Wildlife
Craig Bromley	Archeologist	Cultural and Paleontological
Ben Kniola	Assistant Field Manager	Reviewer

4.2. Summary of Public Participation:

There was no public scoping or involvement process applied to this action apart from posting the Notices of Staking at the BLM Lander Field Office for 30 days and posting the Environmental Assessment on the BLM NEPA Register.

This page intentionally
left blank

Appendix A. Map of Project Area

